I M S A I DOES IT AGAIN !!!

N E W

PERIPHERALS INTERFACES SOCKET SETS

IMSAI is pleased to announce seven new products. They are designed to enhance your enjoyment and extend the application flexibility of your IMSAI computer.

Video Display Module

Keyboard

Software

Multiple I/O Board

Breadboard Console

Programmable Parallel I/O Board

Socket Sets for each Board

The enclosed documentation describes each product and gives ordering information, availability, and price.

Note that a 5% "early bird" discount is available on certain products.

A L L Y O U R I N P U T / O U T P U T

O N O N E B O A R D

The new IMSAI five-port Multiple I/O board combines the most commonly used I/O interfaces on a single board with a control port, serial channel, cassette interface and 2 parallel I/O ports. A Keyboard, printer, tape cassette and teletype (or CRT) can all be controlled by a single MIO board simultaneously!

Compatibility with IMSAI and Altair software is assured through the flexible addressing and control features. Tape cassette applications are enhanced through the inclusion of the Byte/Lancaster and Tarbell recording modes.

T a p e C a s s e t t e I / O F e a t u r e s

- Byte/Lancaster standard recording mode of approximately 30 bytes/second.
- Tarbell recording mode of 187 bytes/second. Can be substantially increased when using high quality audio equipment.
- Data bit rates available are 488 to 62,500 bits/second.
- Two tape recorders can be connected -- you can output to both simultaneously or read from one at a time.
- Little software control required. Serialization and deserialization are done in hardware for the Tarbell mode. A small software driver for the Byte/Lancaster mode is provided.
- Instructions and test programs for tuning the recorder and interface for optimum performance are included.
- Additional control of the recorder can be implemented using the lines from the control port.

Serial I/O Features

- Compatible with IMSAI and Altair software.
- Teletype or RS232C I/O port using a UART.
- Control lines available from the control port.
- Baud rate continuously selectible from 40 to 9600 asynchronous.
- Byte length, parity enable and even/odd parity is selectable.
- Instructions and test programs for checking the port are included.
- Directions for connection to a teletype are included.

Parallel I/O Features

- Two 8-bit parallel I/O ports.
- All input and output data lines latched for interfacing simplicity.
- "Handshaking" is convenient with the control lines for input and output.
- Instructions and test programs for checking the port are included.

Control I/O Features

- This port provides the necessary control and status of the other four I/O ports.
- Output lines are latched for convenience.
- Controlling other devices is easy with the TTL, EIA, current loop lines and high voltage high current drivers.

Ordering Information

Item	Description	PRICE Kit	PRICE Assembled
MIO	Multiple I/O board with cassette interface, serial channel, control port and 2 parallel I/O ports. Requires edge connector EXPM. Order 3 cable A's for for the two parallel and one serial ports and one or two MIO-Cable M for the cassette port.	$195.	$350.
MIO Cable-M	Cable from the board to the rear of chassis for the cassette recorder interface. Terminates in a BNC connector.	--	$ 12.

Availability

First customer shipments in September, 1976.

Save 5% by ordering prior to August 15 and paying in full at time of order.

(Specifications are subject to change without notice.)

COLOR CHARACTERS AND GRAPHICS ON YOUR TV

The IMSAI VDM is the most powerful and flexible video display module available. With up to three boards that fit into your IMSAI 8080 (or Altair 8800) you display color characters and color graphics simultaneously. The many features, most under software control, offer unlimited display creativity.

Overall Features

- Use your home TV or a monitor.
- Optional TV channel 4; channel 3 is standard.
- Attach a keyboard to the 8-bit input port.
- TV interface (RF converter) - IMS is applying for and intends to obtain an FCC license for the RF converter. When obtained, IMS will notify you and provide a simple modification to the circuit allowing the VDM-TV interface to function.
- All cables included.
- Large capacity display -- 240 scan lines and 50 microseconds per line.
- Flicker free image changing through memory and DMA refresh of image.
- Unlimited image control because several images may be in memory at once and only those currently linked together will be displayed.
- Fast program response with interrupt capability.
- Scrolling is fast and flexible (portions of the display may be scrolled) using the display link feature.
- Overlays of graphics and characters and partial display of each.
- Eight colors, plus seven half-tones -- white, yellow, blue, red, cyan, magenta, green, black.
- Colors are industry standard -- no adjustment required.
- Complete documentation included.

Character Display Features

- The full ASCII character set of 128 characters (upper case, lower case and special characters).
- Alternate, optional, high resolution character set. Selectable under program control. Uses fusible link or erasable PROMs.
- Line count is variable between 6 and 24 lines (about 16 on a home TV).
- Number of characters per line is variable between 16 and 80. (A home TV will accept about 32 with good resolution.)
- Blinking of any character (software controlled).
- Reverse video in color or black and white of any character (software controlled).
- Underscore of any character (software controlled).
- Double-size characters -- line at a time (software controlled).
- Simultaneity of the above four software controlled features.
- Character format -- upper case is 5 by 7 dot matrix and lower case is 5 by 9 dot matrix.

Graphics Features

- Each displayed graph element (cell) is a rectangle.
- Combined graphics and character displays will match since the graph cell size is proportional to the character size.
- Full color control of each graph cell.
- The display resolution is variable from 120 by 160 cells to 30 by 32 cells.

Ordering Information

Item	Description	PRICE Kit	PRICE Assembled
VDM-MCG	Complete graphics and character capability. Includes the master control board (VDM-M), graphics board (VDM-G), character board (VDM-C), coaxial cable to rear of chassis and to TV; crystal for channel 3. Order a Cable A for the parallel I/O port. Requires 3 edge connectors (EXPM).	$699.	$1199.
VDM-MC	Color character generation only. As above, less the graphics board. Requires 2 edge connectors (EXPM).	$499.	$ 849.
VDM-MG	Color graphics generation only. Like the VDM-MCG, less the character board. Requires 2 edge connectors (EXPM)	$399.	$ 679.
VDM-C	Character generator board. Requires the VDM-MG. Requires 1 edge connector (EXPM).	$300.	$ 550.
VDM-G	Graphics generator board. Requires the VDM-MC. Requires 1 edge connector (EXPM).	$200.	$ 350.
VDM-GAF	Contains circuitry to permit user supplied fusable link PROMs to be used for the alternate character generator. Requires VDM-G board.	$ 69.	$ 119.
VDM-GAE	Contains circuitry to permit user supplied erasable PROMs to be used for alternate character generator. Requires VDM-G board .	$ 69.	$ 119.
VDM-MF4	Crystal for channel 4. (The system is shipped with a channel 3 crystal. Requires VDM-MCG, VDM-MC or VDM-MG.	$ 19.	$ 30.

Availability

First customer shipments September, 1976.

Save 5% by ordering prior to August 15, 1976. Full payment must accompany order.

(Specifications are subject to change without notice.)

K E Y B O A R D

Mechanically rugged, high reliability, 53 key, ASCII encoded keyboard. Has good touch quality. Upper case alpha-numeric keys that duplicate the functions of the ASR-33. Will interface to any 8-bit parallel port. Packaged in commercial grade aluminum case that is color coordinated with the IMSAI 8080. Complete with connecting cable.

F e a t u r e s

- o Full 53 key format.
- o Double-molded key caps.
- o On-board interface circuit.
- o Two-key roll-over with audio feedback.
- o Display panel with indicator LED's for the shift and control key as well as the ASCII bit pattern.
- o Commercial grade cabinet.
- o Includes connecting 5 foot flat cable and two E.I.A. 25-pin connectors.
- o Size: 8" x 15" x 2½"

O r d e r i n g I n f o r m a t i o n

Item	Description	Kit	Assembled
KEY-1	Keyboard, case and cable	--	$199.

Availability

First customer shipments are in October, 1976.

(Specifications subject to change without notice.)

I M S A I

I N T E L L I G E N T B R E A D B O A R D S Y S T E M

Learn now to replace discrete devices in digital logic circuits with microprocessors and computer software. Develop new I/O interfaces and memory systems that connect directly to, yet are physically outside, the computer. Study tradeoffs between hardware and software implemented circuits. Exercise comprehensive test procedures on new circuits under computer control. Set up a sophisticated classroom laboratory for logic design courses.

The IMSAI Intelligent Breadboard System offers these benefits and more with its sophisticated breadboard console connected directly to an IMSAI 8080 computer. The new Programmable Parallel I/O board (PIO-6) is the computer interface to the breadboard console. It brings out the computer's address lines, data lines, miscellaneous control lines and power lines to the breadboard console, as well as allowing TTL data communication between a computer program and the breadboard. Thus breadboard circuits can be built upon the bus logic of the 8080 while remaining outside the computer chassis for ease of construction and analysis.

F e a t u r e s

- Integrated circuits, resistors and capacitors can be plugged into the solderless terminal strips.
- Up to forty 16-pin IC's may be inserted.
- Easy access to all signals for quick probing.
- On board 5-volt voltage regulator.
- Power supplied is +18, -18 and +8 volts.
- LED's are used as latched and unlatched level indicators.
- All pin numbers are identified.
- Two computers may be connected to one breadboard to study multiprocessor circuit design.

- Six 8-bit parallel I/O ports from the computer's PIO6 board can be connected to the breadboard via two 50-pin cables.
- The computer's address, data, power and miscellaneous control lines are made available via the PIO6 board and a 26-pin cable.
- Extensive user documentation.
- Test module available.

Ordering Information

Item	Description	PRICE Kit	PRICE Assembled
BBC-5	Complete breadboard console with space for forty 16-pin IC's, 10 LED's, 2 5-volt regulators, two 50-pin connectors, one 26-pin connector. Order PIO6-6 board, 2 Cable R and 1 Cable S. .	$435.	$625.
BBC-3	Breadboard console with space for 24 16-pin IC's, 5 LED's, one 5-volt regulator and one 50-pin connector. Order a PIO6-3 or PIO6-6 board and 1 Cable R.	$325.	$532.
BBCM	Module to upgrade a BBC-3 to a BBC-5. Order a PIO6M, Cable R and Cable S to upgrade the PIO6-3 board to a PIO6-6 . .	$135.	$155.
BBC-Test Module	A cable and board to enable closed loop testing of the PIO6 board, cables and breadboard console. Requires a correctly operating PIO6 as a control. .	$169.	$279.
Cable R	A 50-pin cable with board edge connector and breadboard connector that carries three 8-bit ports and other lines between a PIO6 board and the breadboard	--	$ 35
Cable S	A 26-pin cable with board edge connector and breadboard connector that carries bus signals between a PIO6 board and the breadboard	--	$ 25

Item	Description	PRICE Kit	PRICE Assembled
DOC-8	8080 PROGRAMMING FOR LOGIC DESIGN. This textbook shows how to implement digital combinatorial logic circuits in software. It first simulates well-known digital logic devices using assembly language; then it shows how to simulate an entire schematic, device by device.	--	$ 12.
DOC-9	IMSAI INTELLIGENT BREADBOARD WORKBOOK. This workbook provides numerous laboratory exercises. It first demonstrates how to use the breadboard; then it describes circuits for construction on the IMSAI 8080 computer.	--	$ 15.

Availability

First customer shipments in September, 1976.

(Specifications are subject to change without notice.)

P R O G R A M M A B L E P A R A L L E L I / O

This new parallel I/O board is designed for applications requiring broad flexibility in TTL interfacing of the computer peripheral devices. Extensive program control over the direction and action of the parallel I/O lines is provided through the new INTEL 8255 integrated circuit chip. Development of circuits requiring fast interaction with the computer is simplified with the extension of many bus lines from the computer to the board's edge connectors and cable.

F e a t u r e s

- Contains six programmable 8-line parallel I/O ports. (Three are optional.)
- Extends a fully buffered microprocessor I/O interface to a peripheral device.
- Contains two connectors for 50-pin cables and one for a 26-pin cable.
- Each 50-pin cable contains the 24 I/O line from an INTEL 8255, low order address lines, data bus, miscellaneous microprocessor control lines, +8, +18, and -18 volts unregulated, and ground.
- The 26-pin connector contains the high order address lines, miscellaneous microprocessor control lines and ground.
- Complete technical and users documentation is provided.

Ordering Information

Item	Description	PRICE Kit	PRICE Assembled
PIO6-6	Board with all components to support six 8-line ports and all bus lines that are brought out to the board edge. Requires edge connector EXPM. Order two PIO6 Cable R and one PIO6 Cable S.	$169.	$279.
PIO6-3	Board with components for three 8-line ports and all bus lines that are brought out to the board edge. Requires edge connector EXPM. Order one PIO6 Cable R and one PIO6 Cable S.	$139.	$232.
PIO6M	Expansion module to add three 8-line ports to a PIO6-3.	$ 54.	$ 90.
PIO6 Cable R	Cable with 50-pin card edge connector on one end and header socket on the other. Five feet. Order one or two with each PIO6 board.	--	$ 35.
PIO6 Cable S	Cable with 26-pin card edge connector on one end and header socket on the other. Five feet. Order one with each PIO6 board.	--	$ 25.

Availability

First customer shipments will be made in September, 1976.

(Specifications subject to change without notice.)

S O C K E T S E T S

IMSAI now has socket sets available for each board. While sockets promote easier board maintenance, they can decrease reliability in certain cases. Use with caution in humid or salt air environments. Do not use when the computer is subject to vibration or where utmost reliability is required.

O r d e r i n g I n f o r m a t i o n

Item	Description	PRICE Kit	PRICE Assembled
S-RAM 4A-4	Socket set for RAM 4A-4 board . . .	$22	$33
S-PIC-8	" PIC-8 board.	$ 6	$10
S-PROM 4-4	" PROM 4-4 board . . .	$ 4	$ 6
S-MPU-A	" MPU-A board.	$ 8	$12
S-CP-A	" CP-A board	$11	$16
S-PIO 4-4	" PIO 4-4 board. . . .	$11	$17
S-SIOC	" SIOC board	$ 3	$ 5
S-SIO 2-2	" SIO 2-2 board. . . .	$12	$18
S-VDM-M	" VDM-M board.	$26	$40
S-VDM-G	" VDM-G board.	$24	$36
S-VDM-C	" VDM-C board.	$26	$40
S-MIO	" MIO board.	$24	$36
S-PIO 6-6	" PIO 6-6 board. . . .	$ 9	$14

Availability

First customer shipments in September, 1976.

N E W A S S E M B L Y S O F T W A R E

D E V E L O P M E N T P A C K A G E

A substantially upgraded version of our current self-contained system (the assembly language package provided at no charge) is now available. The enhancements offer a powerful package for developing medium-sized sophisticated assembly language programs.

F e a t u r e s

- Powerful debugger with multiple dynamic and static breakpoints, number conversions, memory searches, I/O port control, trace, hex arithmetic and many other features.
- Symbol table space of 8192 bytes.
- Facility for adding additional device drivers to support a wide variety of I/O devices. (The teletype driver is included).
- Programs may be loaded from industry standard object paper tapes.
- Any I/O device may be used for the source, object or listing.
- Includes a line editor using the current SCS.
- Improved assembly and monitor.
- Resides in high memory so that it may be co-resident with application programs and BASIC.

B000 - CDFF	System software
D000 - EFFF	Local memory and symbol table
F000 - FFFF	I/O device drivers
0038 - 003A	Interrupt handling

Ordering Information

Item	Description	PRICE Paper Tape	PROM*
PGM-6A	Object code, documentation, source listing	$ 40.	$230.

*Requires two PROM 4-4 boards.

Availability

First customer shipments will be made in August, 1976.

(Specifications subject to change without notice.)